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ENVIRONMENTAL IMPACT STATEMENT

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January 5, 1972

Pursuant to: Montana Environmental Policy Act
Section 69-6504 (b) (3)

Project No. FG-3

Upper Gallatin Special Permit Elk Season

Prepared by

Montana Fish and Game Department

Game Management Division

Helena, Montana 59601

ENVIRONMENTAL IMPACT STATEMENT
Upper Gallatin Special Permit Elk Season
January - February, 1972
Montana Fish and Game Department
Helena, Montana

The Montana Fish and Game Department wishes to conduct a late elk season in portions of the Gallatin and Madison River drainages to reduce in numbers the Gallatin elk herd.

This proposal came about because that elk herd was not adequately reduced by harvest during the general season causing an elk population too large to be adequately wintered by the available forage on traditional wintering areas. Furthermore, such heavy foraging pressure which will likely occur will set back range conditions (carrying capacity) which have been steadily improving in recent years.

The Season:

One thousand either sex elk permits will be issued by drawing to holders of valid (unused) 1971 elk tags. Two hundred and fifty permits will be assigned to each of four three-day hunting periods. The hunting periods are confined to the months of January and February, 1972.

Hunters will be required to stop at a Game Checking Station prior to their hunting period to have their permits validated and receive special instructions.

When the permits are validated, hunters will be assigned one of four hunting areas depending upon elk distribution.

Snowmobile use will be restricted to hunters who have downed game in a hunting unit. Persons using snowmobiles may enter the area between 12:00 noon and 6:00 p.m. each day without firearms to retrieve downed game only.

The season will continue until:

(1) The quota of 500 has been reached,
(2) Or until it becomes apparent the season is ineffective,
(3) Or by February 6, 1972, whichever happens first.

A map of the four hunting units and the information sheet to be given hunters is attached. (Appendix I)

The Gallatin Elk Herd's Winter Population and Winter Range Characteristics.

The Gallatin elk herd is a migratory population of elk which inhabit areas in and adjacent to the northwest corner of Yellowstone National Park (Fig.1). These elk summer in high alpine meadow areas at the head of the Gallatin River drainage adjacent to the Yellowstone drainage to the east and adjacent to the Madison drainage to the west. During the fall the various Gallatin herd segments move down the drainage to a wintering area located at the northwest corner of the park. As winter approaches the majority of the elk migrate further down drainage to three other wintering areas; two of which are in the Gallatin drainage and one on the east side of the Madison. Migration timing is largely geared to weather severity during the fall and early winter, but generally begins in November and is usually complete by mid-February. These elk begin their return migrations during the latter part of May.

The Winter Ranges.

The segments of the Gallatin elk herd have traditionally wintered in four major areas. These areas, Porcupine Game Range, Taylor Fork area and Yellowstone Park Vicinity are in the Gallatin Drainage (Fig. 1). One area, Bear Creek Game Range, lies on the east slope of the Madison drainage. Ownerships of the wintering areas are primarily U.S. Forest Service, Burlington Northern (leased by Montana Fish and Game) and Montana Fish and Game. The area actually available varies considerably during the different months and years depending on snow and weather conditions.

Johnson (1951) characterized the winter range as broad, open slopes with open stands of timber and dense timber on north slopes. Common tree species include: Lodgepole pine (*Pinus contorta*), Douglas Fir (*Pseudotsuga menziesii*), Engelmann spruce (*Picea engelmanni*), Subalpine fir (*Abies lasiocarpa*) and Aspen (*Populus tremuloides*). Common shrubs include sage brushes (*Artemisia spp.*), and rabbit brushes (*Chrysothamnus spp.*) in open upland areas, and willow (*Salix spp.*) and shrubby cinquefoil (*Potentilla fruticosa*) in the bottoms. Common grasses include Idaho fescue (*Festuca idahoensis*), wheat grasses (*Agropyron spp.*), June grass (*Koeleria cristata*) and blue grasses (*Poa spp.*). Sedges (*Carex spp.*) are characteristic of the wet meadow lands. Common forbs are Phlox (*Phlox spp.*), asters (*Aster spp.*), pussytoes (*Antenneria spp.*), Milkvetches (*Astragalus spp.*), dandelion (*Taraxacum spp.*) and Senecio (*Senecio spp.*).

Open, grassy, smooth facing slopes, some Douglas fir timber types and willow bottoms provide important emergency food sources when deep and crusted snow makes other foraging areas less useable.

Soils on the south facing slopes and ridge tops are generally clayey, interspersed with varied amounts of rock particles. Several minor land slumps occur throughout the areas.

Temperatures range from a mean monthly maximum temperature of about 80°F. in July and August to a mean monthly minimum of about 5°F. during January and February. Precipitation ranges from 10 to 20 inches a year and averages about 15 at Porcupine Creek. Precipitation at higher elevations adjacent to wintering areas can increase greatly. Winters vary considerably in snowfall, crusting condition of the snow and in temperatures.

History Relative To Wintering Areas.

In the early 1800's explorers and trappers traveled through the area, many of which related seeing various game species of which elk were included. Bozeman was settled in the mid-1800's. During the later 1800's Yellowstone Park was established and it was common for Bozemanites to travel up to the lower (Porcupine) and upper (YNP vicinity) Gallatin drainage basins to hunt elk. Some years hunters did well, yet other years they would come home empty-handed. A game preserve was established at the YNP vicinity, in 1911, to allow elk to migrate unhindered by hunters. During 1929 the boundary of YNP was moved from Black Butte Creek north to its present location. Wolves and predators were trapped, shot and poisoned in the early 1900's.

From the late 1800's until about 1908 livestock grazing was unrestricted on any portion of the Gallatin Canyon. Livestock were brought in during April and May and would stay until the snow drove them out in the fall. By 1935 most of the livestock use in the canyon ceased.

Gallatin Elk Populations.

General comments about Gallatin elk during the turn of the century came mostly from returning hunters. Many years they would boast of the abundance of elk, yet there were years when hunting was very poor and most would return empty-handed.

By 1919 the U.S. Forest Service began making yearly ground counts and estimates during late winter and early spring (table 1). Population estimates ranged from 1400 to 3100 elk and averaged 2240 from the years 1919 through 1947.

Game harvests have been checked at the mouth of the Gallatin Canyon since 1919. Elk harvests from 1919 through 1947 ranged from 20 to 1177 elk per year and averaged 306. The variation in harvest was related to weather conditions during the fall. Winter losses due to malnutrition for this 29-year period totaled 2654 elk which averaged to be 92 per year. Calf/cow ratios obtained during 9 winters of the same period, ranged from 15 to 45 calves per 100 cows and averaged 30.

In summary for this 29-year period the Gallatin elk herd was relatively stable. Harvests were relatively small and not limiting to the elk population. Winter losses and low calf productions were the main limiting factor to the elk population.

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Elk surveys were made with the aid of fixed wing aircraft during the years 1948 to 1964. The numbers shown for this period are actual numbers of elk observed and not estimates as indicated for 1919-1947, (table 1). During this period "counts" ranged from 1221 to 2145 elk and averaged 1590. Harvests were also variable ranging from 72 to 941 elk and averaged 464. Four major winter losses occurred during this period averaging a die-off of 154 elk per every fourth year. No data was available for years having lesser die-offs. There were seven years when winter elk classifications were made. The cow/calf ratios ranged from 15 to 40 calves per 100 cows and averaged 28.

For this 16-year period winter populations decreased while harvests increased as compared to the previous period. Winter die-offs were significant but of less magnitude and frequency than before. The calf productions were comparable. It is apparent the factors limiting the population were the die-offs and low calf production as occurred previously.

From 1964 through 1971 some differences can be seen in the aerial surveys. In 1964 an observed population of 2145 elk was reduced in numbers by a late season to 1391 (table 1). During this period "counts" varied from 1100 to 1701 elk and averaged 1360. Comparing winter populations of this period with the earlier ones some factors should be considered. Prior to 1964 the migration to the Madison was small when compared to it after 1964 (table 2). Surveys and estimates during the first period were made after any migration to the Madison would have occurred. Since aircraft was used (1948), surveys were made prior to significant elk movements to the Madison drainage. The significance of this is that the difference of winter elk populations for the periods of years in the Gallatin is conceivably greater than the figures indicated.

Harvests were large during the first portion of this last period of years but have tapered off recently. The largest winter loss during these recent years was 52 elk (averaging 21 per year). Cow/calf ratios ranged from 24 to 50 calves per 100 cows and averaged 40. During the last five years the average was 45 calves per 100 cows which is 50% greater than the averages of previous periods.

The data indicates the reduced population to be healthier and more productive as evidenced by the drop in winter losses and significantly greater calf crops than documented previously.

Elk distribution among the wintering areas also shows a difference when comparing pre-1964 years to the post-1964 years (tables 2 & 3). The migration to the Madison has increased since 1964 as previously discussed (table 2).

In the Gallatin prior to 1964 wintering populations were extremely erratic on the Porcupine Area, Taylor Fork Area and at Yellowstone Park Vicinity (table 3). Since the elk reduction of 1964, the wintering populations on all wintering areas of the Gallatin elk herd have become amazingly consistent.

Food Habits.

A Forest Service technician reported in 1936 after detailed observations in the Gallatin that grass made up the largest portion of the elk diet during the winter except when heavy crusted snow prevailed, then use of browse became heavy. Greer (1958) found that grass was the major item in the rumens of elk in good condition taken during the winter. Rumens from elk which died during the winter from malnutrition contained mostly browse. Rumens taken from winter road kills during the 1960's also showed the same trend. Thus it appears that grass is the most commonly taken winter food item in the Gallatin during mild or moderate weather conditions. Browse becomes important during periods of stress.

Use Patterns.

Elk use of habitat types and exposures was investigated by flying transects systematically across the winter ranges with a helicopter during periods of elk feeding activity. Of 2,661 elk observed, approximately 82% were on southerly and westerly exposures, which receive the prevailing winds and sunshine (table 4). Seventy-four percent were seen in sagebrush-grassland habitat, 21% in timbered areas, 3% in willow and sedge bottoms and 2% in aspen patches.

Grass Range[1].

Condition

Packer (1963) studied soil stability requirements on the Gallatin winter range using native and seeded ground and protected (in exclosures) plots. He found ground cover (litter plus plant basal area at soil surface) of 97.5% on plots protected by snow from elk grazing, but only 24 to 33% ground cover on plots grazed by elk. He recommended as a management objective maintenances of at least 70% ground cover, since with lesser amounts soil erosion caused by summer rainstorms accelerated rapidly.

The reasonableness of Packer's objectives was demonstrated by two 50-foot long line intercept transects placed across a very steep (32°) south-facing slope on the northern extremity of the winter range in August 1965. This area, Jack Smith Slope (fig. 1) is grazed by elk every winter, but the grazing pressure is light to moderate. Total ground cover was 69%, plant cover was 37% and bare ground and rock were 31% (table 5).

Ground cover on 23 similar transects placed on much less steep slopes (20°) or less) and ridge tops nearer Yellowstone National Park (fig. 1) in July and August 1965 averaged only 42% ground cover, 23% plant cover and 58% bare ground and rock (table 6).

Ten square yard quandrants were measured on similar sites inside Yellowstone National Park in the summer of 1967 (fig. 1). Basal areas of grasses and forbs, drawn to scale on graph paper, covered only 8% of

the total quandrant area (table 7). Shrub cover averaged 2%. Litter, not differentiated, was included with bare ground and rock (93%).

It appears the grassland topographic climax should be a bluebunch wheatgrass-Idaho fescue community. Wright and Wright (1948), describing undisturbed areas in the neighboring Bridger Mountains, found Idaho fescue type on well drained soils with favorable moisture conditions with bluebunch wheatgrass predominating on drier sites. The sparcity of these grasses, lack of litter, prevalence of bare ground, active soil erosion and dominance of prostrate, grazing resistant species amongst the shrubs and forbs indicated the poor condition of the south-facing slopes and ridgetops used by the elk.

Club moss, the most abundant species encountered on the line intercept transects decreased from 21% on Jack Smith Slope to 7.5% on the more heavily grazed portions of the winter range nearer Yellowstone National Park and was not present at all on the quadrants within the Park, the most heavily grazed area.

It seems apparent the vegetative cover deteriorated because of livestock grazing followed by heavy elk use.

Condition and Trend Under Protection From Grazing

Three Forest Service elk proof enclosures were erected on the following grassland sites and were observed for vegetational changes: in 1941 in the Meadow Creek drainage (2½ acres), in 1945 on Crown Butte (5 acres), and in Porcupine drainage (5 acres). At each location Parker Transects (Parker 1951) were established and plant basal areas, litter, rock and bare ground measurements were obtained periodically.

After 8 to 27 years changes are most notable in amount of bare ground (table 8). Bare ground was generally less inside than outside during any year. Also amount of bare ground decreased from 1953 to 1968 within the exclosure but remained static outside. Litter was greater inside than outside during respective years and increased with time on the inside but varied on the outside.

None of the slopes had enough measured total cover (70%) to meet Packer's (1963) criteria for prevention of accelerated soil erosion, although cover on the protected slope at Porcupine Creek approached that level (64%).

The canopy-coverage method (Daubenmire 1959) was employed at the Porcupine Creek and Meadow Creek exclosures in July 1963 to evaluate conditions on ridge tops extending through the exclosures. Total cover, consisting largely of live vegetation, on the protected ridge tops at each site was about double the total cover on the control transects (table 9). Bare ground was half as great inside as compared to outside the exclosures. It is interesting to note that both protected sites

showed more than 70% ground cover (less than 30% bare ground) which means soil erosion has been halted within. This was not true of any unprotected site. The poor recovery on the slopes of the exclosures as compared to the ridge tops is likely due to greater loss and continuing erosion of soil on the slopes.

[1] Taken and modified largely from an unpublished paper assembled by James Peek, Allen Lovaas and Bill Barmore.

Willow Range.

Condition

Willow has deteriorated extensively in some areas since 1924 as illustrated by comparison photos exhibited in a special report by Lovaas (1970). This important winter emergency food source has been virtually eliminated in some portions of the winter range.

Condition and utilization of remaining willow have been studied each spring since 1957 on 10 plots of 25 tagged plants each located through the winter range (fig. 1), using the key browse survey method (Cole 1963). When a tagged willow plant was totally dead, its tag was transferred to an adjacent live plant. From 1957 through 1964, an average of 83% of the willow plants examined were in decadent condition (25% or more of the crown area dead) and an average of 64% was severely hedged from browsings. The annual mortality rate for 100 to 150 plants examined yearly over this period in and adjacent to Yellowstone National Park and in the Porcupine drainage averaged 4.7%.

Condition following an elk reduction.

Post elk reduction 1966 - 1971 data from willow plots indicated willow response: average 49% willow plants in decadent condition (prereduction 83%), averaged 34% willow plants severely lodged (prereduction 64%), averaged 0.6% annual willow mortality (prereduction 4.7%).

Desired Winter Gallatin Elk Populations.

Porcupine Area (including Deer and Dudley Creeks)	400
Taylor Fork Area	300
YNP & Vicinity	300
Madison-Bear Creek Area	500
TOTAL	1500

These figures are based upon post-1964 population and range information which has allowed for improvements in the condition of the herd and range productivity.

Present Population.

An aerial survey made in the Gallatin drainage only during December 1971 showed a total of nearly 1900 elk. At that time a ground estimate in the Madison drainage indicated about 200 elk there. Thus the total Gallatin elk herd is very likely 2100. This is the largest since the 1964 count of 2145. Also 2100 is above the population level between 1948 and 1964 and almost equal to the level prior to 1948.

Probable Impact of the Season.

The season will at best reduce the present Gallatin elk herd from approximately 2100 elk to approximately 1600 (a 25% reduction). We have learned from previous experience in the Gallatin that a population of about 1500 with proper distribution will graze their wintering areas only to a moderate degree. Moderate grazing intensity in recent years has allowed the condition (vigor and productivity) of the grass and willow range to improve. This improvement if allowed to continue will in future years improve the quality and quantity of vegetation on the wintering areas thus enhancing these areas' ability to winter elk. Thus, it is possible to raise more elk in the future by temporarily reducing elk numbers now.

Snowmobiles

Use of snowmobiles will be allowed to retrieve downed game in the hunting areas after 12:00 noon each day. However, the snowmobile trails left in the snow will "disturbance harden", hindering elk from pawing to the vegetation beneath. This effect will be minimal on critical areas because:

(1) Most elk are taken in timbered areas away from important feeding areas.
(2) Most hunters with game, drag their game by hand down to a traveled access route before getting a snowmobile to assist.

(3) Loose snow and steep slopes prohibit snowmobile use off well-packed access routes in most areas.

(4) Snowmobile use is restricted to retrieving downed game only.

(5) The affected areas will be a minute percentage of the total wintering area involved.

Some Noise and Site Harassment Will Occur from Snowmobile Use

This effect is greatly minimized by design and will not have a significant effect on elk because:

(1) Snowmobile use is permitted from 12:00 noon to 6:00 p.m., a time when elk are bedded down in timber which is mostly inaccessible by machine. Also, the sound does not carry well in that timber.

(2) Elk feel secure in timber and must be relatively closely approached before disturbed. A cracking twig nearby is much more disturbing to elk in timber than a more distant sound of a motorized vehicle.

(3) Elk will not at any time be pursued by hunters on snowmobiles, since use is restricted to retrieving downed game only.

Hunters

Hunting in many cases will be done by hunters on snowshoes, which has the potential of "disturbance hardening" the snow and making some forage unavailable. This effect will exist only to a small degree, since most of the hunting will occur in timbered areas, not important feeding locations, and most hunter travel through open areas will be confined to a few well-packed routes leading to areas where elk are bedded.

Hunters will harass elk while pursuing: This effect will be minimized by:

(1) Hunting will be done in three-day periods separated by four-day "rest" periods.

(2) Elk in open feeding areas will move quickly into the timbered areas early each morning while hunters approach from a distance. The intensity of this type of disturbance is small unless hunters are close enough to shoot.

(3) Once in the timber, elk usually break up into small bunches, and pursuit will be confined to small groups. The intensity of disturbance from pursuit in the timber is high for the groups which are affected.

(4) Disturbance is not unnatural to a prey species such as elk. Effects of this type disturbance in past late seasons have not been shown to be detrimental to the population. In fact, random disturbance helps in distributing elk over their entire range, thus avoiding heavy use by a concentration of elk.

Alternatives to a Late Elk Season.

No Season

No season would allow the present large population to attempt to winter

on the limited wintering areas. Such a condition would likely exert greater than desirable grazing pressure on important grass and shrubs in the areas. Plant litter would be reduced and plant vigor decreased, allowing for increased water runoff and erosion (soil loss) to occur on critical sites. The final result, if continued, would be a loss in winter elk carrying capacity. For elk it might mean starvation and loss of the young and old of the population and a loss of calving success in the adult female segment. A general reduction in health of the elk population would occur.

No Season and Artificial Feeding

Non-reduction resulting in visible losses to the elk population, in the eyes of some people, would necessitate the assistance of feeding hay to starving elk. This would be the least desirable alternative. Feeding hay is very costly and does not relieve the problem of over-population, but increases it. The most significant fact is that extreme over-utilization of the grass and shrub range occur on and adjacent to the feeding areas which further reduces and sets back the natural carrying capacity. Thus, the artificial buildup of the population and the loss of carrying capacity further necessitates feeding in the following year. Once feeding is begun, it is very difficult to stop. Buying game ranges is a much better use of money and is better for elk.

Trapping and Transplanting Alternative

It is the most desirable alternative; however, there are many adverse effects. It is probably the least expensive alternative. No real bad effects exist, if one is only concerned with the Gallatin area. However, problems and adverse effects come into play once the elk are in the trucks. It is very difficult to find a place in Montana that is an acceptable receiving site. Most areas in Montana which are suitable to raise elk do have maximum populations for their winter ranges. Additional elk would simply cause problems to the well managed herds. Once displaced, elk apparently feel insecure in their new home and begin wintering haphazardly in hopes of finding familiar country. In the process, they get into private areas and begin getting in trouble. In summary, transplanting rarely solves the problem, but simply moves it from one area to another. It should also be noted that there are many areas and circumstances which prevent successful trapping for transplanting.

The intent and design of this season is to keep the Gallatin elk herd slightly suppressed so that:

(1) Grazing pressure will be relieved to allow range recovery.
(2) The health of the animals will continue to improve.
(3) The production of calves will increase.
(4) We can raise more elk on an annual basis and be assured of an elk population for future generations to enjoy, and possibly to have more elk.

Unless a General Hunting Season can be designed and implemented to keep the herd at the desired level, a special reduction like this one may have to occur periodically to do the job.

Other Problems

This category is concerned almost exclusively with "people problems." There are essentially five groups of people who have an interest of one kind or another in the Upper Gallatin elk herd. Group I accepts management proposals and are vocal; Group II accepts management proposals but are not vocal; Group III doesn't seem concerned about management proposals and are not vocal; Group IV rejects management proposals but are not vocal; and Group V rejects management proposals and are vocal. Based on hunting license sales Groups II, III and IV constitute by far the largest grouping. Group V is heard from more often than Group I. However, it is not logical to assume that Group V is larger than Group I or by the same token that Group IV is larger than Group II. It is quite common for protesters against a given action or proposals to be more active, but not necessarily more numerous, than those in favor of an action or proposal.

It suffices to state there are groups of people in favor of the proposed Upper Gallatin special permit elk season and groups opposed to it. It is difficult and expensive (money-wise) to determine exact numbers in each group and to properly evaluate their respective comments and/or criticism.

Figure 1. Showing Map of Gallatin Elk Wintering Areas In The Gallatin and Madison River Drainages.

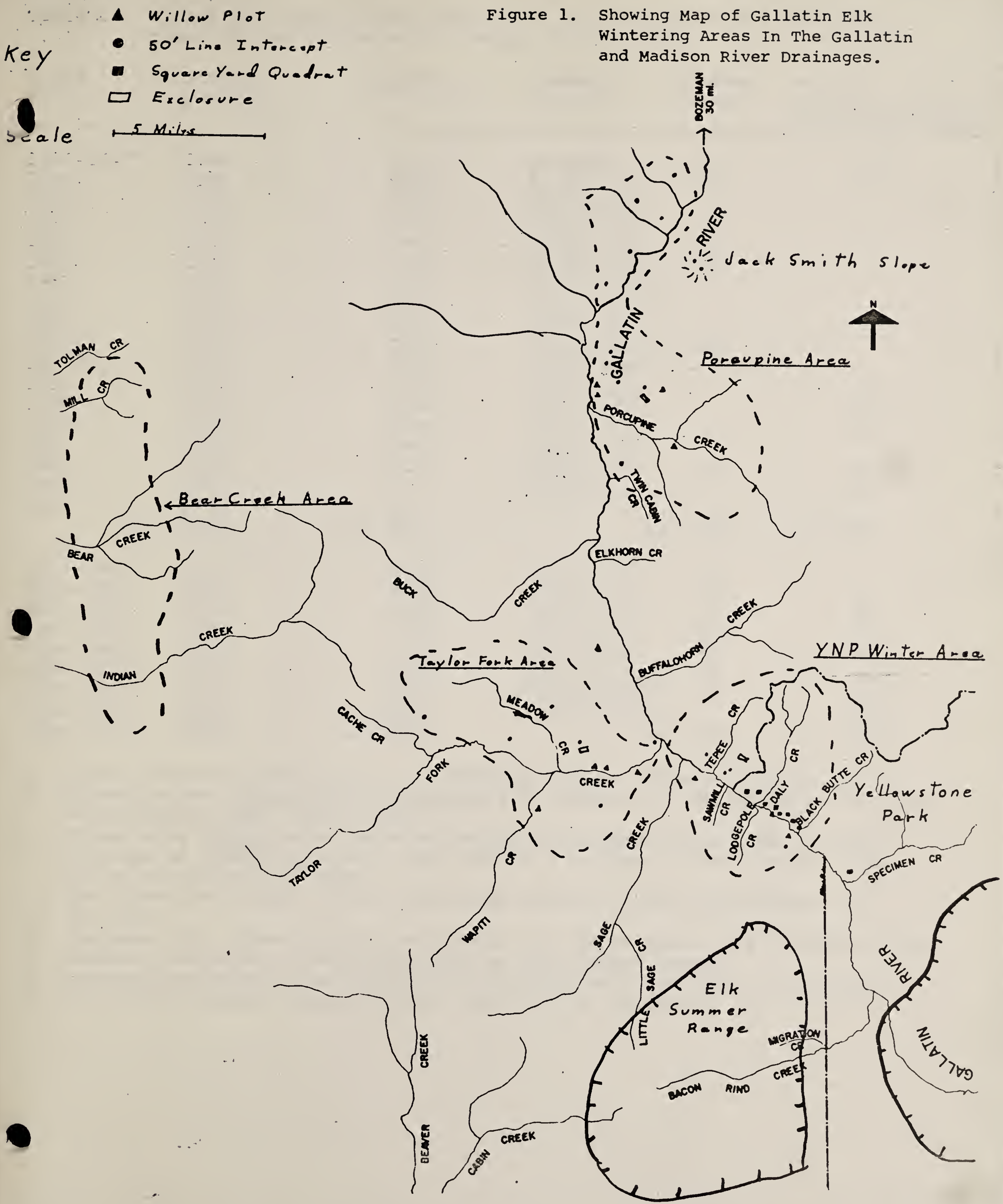


Table 1. Winter Elk Populations, Harvests, Winter Losses and Classifications Of The Gallatin Elk Herd, 1919 to 1971.

Years	Winter[2] Counts	Harvest	Season Dates	Winter Loss	Winter Classification (calves/100 cows)
1919-1947[1]	2240	306	No Data	92	30[3]
1948	1500	536	10/15-12/1	103	15
1949	1706	730	10/15-12/1		
1950	1570	737	10/15-12/1	5	
1951	1603	941	10/15-12/1	4	27
1952	1316	72	10/15-12/1	245	
1953	2106	770	10/15-12/15		
1954	1842	600	10/15-1/18		
1955	2177	878	10/15-12/5		
1956	1235	923	10/15-11/30	200	
1957	1269	221	10/20-1/31		
1958	1221	229	10/15-1/4		29
1959	1379	200	9/20-11/1		39
1960	1688	169	9/18-11/6		20
1961	1430	580	10/5-11/5		
1962	1470	247	9/16-11/5	92	40
1963	1475	321	9/15-11/3		28
1964	2145				
	Av. 1590	Av. 464		Av. 43	Av. 28
1964-1965	1391[4]	867[5]	10/18-11/1	0	
1965-1966	1301	258[5]	10/3-11/7	44	24
1966-1967	1247	493[5]	10/2-11/6	0	36
1967-1968	1100	196[5]	10/1-11/5	22	50
1968-1969	1287	69	10/6-11/3	52	39
1969-1970	1701	186	10/14-11/30	14	38[6]
1970-1971	1474	333	10/18-11/29	15	48[6]
1971-1972	1892	185	10/17-11/28		48[6]
1964-1971[7]	1360	Av. 330		Av. 21	Av. 40[8]

1) Data collected yearly but just averages shown between 1919 and 1947.

2) Ground crews counted and estimated elk numbers in the Gallatin Drainage late winter from 1919 to 1947.
Fixed wing counts were made in Gallatin Drainage from 1948 to 1971.

3) Average of classifications made during 9 winters. They ranged from 15 to 45 calves/100 cows.

4) The 1964-1965 count of 2145 was made prior to the late harvest of 756 elk.

5) Includes elk taken during late hunts and by trapping and transplanting.

6) Summer helicopter classifications on the summer range.

7) Harvest and population count for 1971-1972 not included in averages.

8) 1971-1972 summer classification included in average.

Table 2. Maximum Count Surveys Made On The East Side Of The Madison, 1955-1971.

Year[1]	Date	Count
1955-56		293
1956-57		134
1957-58		196
1959		- No Data
1960		- No Data
1961		- No Data
1962		- No Data
1963		- No Data
1964-65	3-13	932
1965-66	2-24	375
1966-67	3-31	580
1967-68	4-5	691
1968-69	3-14	712
1969-70	3-11	648
1970-71	2-22	671
1971-72	12-	200 (approximately)

1) During the years prior to the 1960's because of private ownership problems on the Madison side, the migration was discouraged by the Montana Fish and Game Department. During that period of year the population likely ranged from 100 to 300 elk.

Table 3. Winter Elk Distributions On Three Gallatin Elk Wintering Areas[1] Taken From Maximum Count Surveys, 1937-1971.

Year	Total	YNP & Vic		Taylor Fork		Porcupine	
		#	%				
1937	2198	957	43	781	35	460	21
1942	2690	900	33	890	33	900	33
1948	766	349	46	234	30	183	24
1949	1642	440	27	661	40	541	33
1950	1570	429	27	684	44	457	29
1954	1368	457	33	389	28	522	39
1955	1833	1275	70	91	5	467	25
1958	1221		95				
1959-60	1267	1199	95	6	T	62	5
1960-61	1688	1049	62	390	23	249	15
1961-62	1430	336	23	467	33	627	44
1962-63	1470	911	62	230	16	329	22
1963-64	1444	1200	83	65	4	179	12
1964-65	2145[2]	917	42	318	15	910	42
1965-66	1491[2]	787	43	197	15	507	42
1966-67	1453[2]	748	54	218	13	487	33
1967-68	1463[2]	673	46	294	20	501	34
1968-69	1287	633	49	123	10	531	41
1969-70	1701	808	48	326	19	567	33
1970-71	1428	813	52	399	28	376	26
1971-72	1892	1340[3]		142		410	

1) Since 1948, survey figures obtained via aircraft during early winter prior to significant migrations to the Madison.
2) Survey made between general season and late season.
3) Migration not complete, figures notfinal.

Table 4. Use of Habitat Types and Exposures By Elk During the 1966 and 1967 Winters Based On Aerial Surveys On The Upper Gallatin Elk Winter Range.[1]

Habitat Type	Total Elk Seen	Percent Observations By Exposure								Cumulative % For Type
		NW	N	NE	E	SE	S	SW	W	
sagebrush/grass land	1954	11	1	0	3	10	40	9	27	74
timber[2]	570	0	5	17	3	3	47	23	3	21
willow & sedge bottoms	90	0	37	0	22	0	11	0	30	3
aspen	47	0	0	0	0	0	0	89	11	2
cumulative % for exposure	-	8	3	4	4	8	40	13	22	-
TOTAL ELK SEEN	2661	211	85	98	92	205	1047	350	573	-

1) Helicopter flights on 22 March and 20 April, 1966; 10 January, 9 February, 21 February, 10 March, and 10 April, 1967.

2) Includes lodgepole pine and/or Douglas-fir communities.

Table 5. Results of 100 Feet of Line Intercept, Jack Smith Slope, Gallatin Elk Winter Range, August, 1965.

	Percent of Intercept
Bare ground	19.5
Rock	11.8
Litter	31.6
Plant cover	37.1
Grass and grass-like	8.0
Forbs	6.8
Clubmoss	20.8
Shrubs	1.4

Percent of intercept of most abundant grasses: *Festuca idahoensis* (5.5), *Agropyron spicatum* (2.2); Forbs: *Eriogonum ovalifolium* (3.2), *Cerastium arvense* (1.8). Species or forms of less than 1.0 percent: 14.

Table 6. Results From 23 50-foot Line Intercepts, Gallatin Elk Winter Range North of Yellowstone National Park, July and August, 1965.

	Percent of Intercept
Bare ground	44.7
Rock	13.4
Litter	19.1
Plant cover	22.7
Grass and grass-like	9.3
Forbs	5.3
Clubmoss	7.5
Shrubs	0.6

Percent of intercept of most abundant grasses: *Festuca idahoensis* (2.5), *Agropyron spp.* (2.7), *Poa spp.* (1.5). Common Forbs were: *Phlox hoodii*, *Arenaria congesta*, *Phlox longifolia*, *Eriogonum ovalifolium*, *Antennaria rosea*. Species or forms of less than 1.0 percent: 32.

Table 7. Results of 10 Square-yard Quadrats, Gallatin Elk Winter Range Inside Yellowstone National Park, Summer 1967.

	Percent Ground Cover	Percent Aerial Cover
Litter, bare ground, rocks	93.3	
Plant cover	6.7	
Grass and grass-like	2.0	
Forbs	4.7	
Shrubs		1.7

Percent of area of most abundant forbs: *Erigeron compositus* (2.2); percent aerial cover of most abundant shrub: *Artemisia frigida* (1.2). Species or forms of less than 1.0 percent: 35.

Table 8. Changes On South Slopes Within Exclosures Compared to Control Sites, Measured in 100 3/4-inch Loop Plots Per Site, Gallatin Elk Winter Range, Montana.

	Porcupine Drainage - 1945				Crown Butte - 1945				Meadow Drainage - 1941			
	Inside Percent		Outside Percent		Inside Percent		Outside Percent		Inside Percent		Outside Percent	
	1953	1968	1953	1968	1953	1968	1953	1968	1953	1968	1953	1968
Bare ground & rock	59	36	72	51	71	64	71	78	72	54	73	73
Litter	25	32	13	26	18	28	15	10	12	33	11	7
Plant Cover	16	32	15	24	12	9	14	13	16	13	17	21
FEID & AGSP[1]	7	10	4	7	3	4	4	4	3	2	4	4
Other grasses	2	4	1	6	T[2]	2	4	2	0	2	1	2
Forbs	5	15	8	8	7	3	7	5	13	6	12	14
Shrubs	2	3	1	2	2	1	1	3	0	3	0	0

1) *Festuca idahoensis* & *Agropyron spicatum*.

2) Less than 1 percent.

Table 9. Changes On Ridgetops Within Exclosures Compared to Control Sites, Canopy-Coverage Method, Gallatin Elk Winter Range, Montana.

	Porcupine Creek			Meadow Creek	
	Inside Percent	Outside Percent	Outside Percent	Inside Percent	Outside Percent
Bare ground & rock	22	50	52	25	46
Litter	20	3	3	5	3
Plant cover[1]	57	35	30	67	44
Grass	45	13	11	40	22
Forbs	9	22	19	23	19
Shrubs	3	1	1	4	3

1) Total cover plus bare ground and rock will seldom equal 100 percent because foliage is layered, and midpoints of six percentage estimates are used for calculations.

INFORMATION AND REGULATIONS FOR THE SPECIAL GALLATIN ELK HUNT - 1972

1. The dates of your assigned 3-day hunting period are shown on your special either-sex elk permit.

2. The special permit must be validated before the holder may legally participate in the hunt. The validation will occur only at the Lower Gallatin Game Checking Station located 6 miles south of Gallatin Gateway on U. S. Highway 191. Permits will not be validated earlier than 2 days prior to the starting date indicated on the permit. The game check station will be open 24 hours/day beginning at 8:00 am on January 3, 1972 and close two days after the announced closure of all hunting units.

3. At the time of validation, each holder will be assigned a hunting unit and will be given a map with legal descriptions and regulations which pertain to the assigned area and the hunt.

4. The areas shown on the enclosed map (see opposite side of the page) are:

   Area 1 -- Porcupine to Buffalohorn)
   Area 2 -- Buck Creek to Sage Creek)-- Gallatin Drainage
   Area 3 -- Tepee and Lodgepole vicinities)
   Area 4 -- Indian Creek to Mill Creek -- Madison Drainage

   The distribution of hunters in each area, by assignment, will depend upon elk distribution. It is likely some areas will not be open during some periods.

5. Snowmobile use will be restricted in the hunting areas as follows:

   a. The use of snowmobiles will be prohibited excepting from 12:00 noon to 6:00 pm daily. They may be used only for the removal of legally taken elk.

   b. Firearms may not accompany any of the occupants.

6. It shall be unlawful for any person to kill more than one elk during any license year.

7. All successful hunters are asked to stop at one of the following checking stations to have their kill tallied:

   a. Lower Gallatin Checking Station located on U. S. Highway 191, 6 miles south of Gallatin Gateway.

   b. Upper Gallatin Checking Station located on U. S. Highway 191 approximately 3 miles south of the North entrance to Yellowstone National Park.

   c. Cameron Checking Station located at Cameron, Montana.

8. Hunters should be equiped to deal with heavy snow condition -- snowshoes highly recommended.

9. This season will be closed upon two day's notice when the quota is reached or on January 30, 1972.

10. Hunting regulations for the special upper Gallatin season are the same as those adopted by the Montana Fish and Game Commission for the 1971 Big Game Season.

11. Legal hunting hours are from one-half hour before sunrise to one-half hour after sunset.

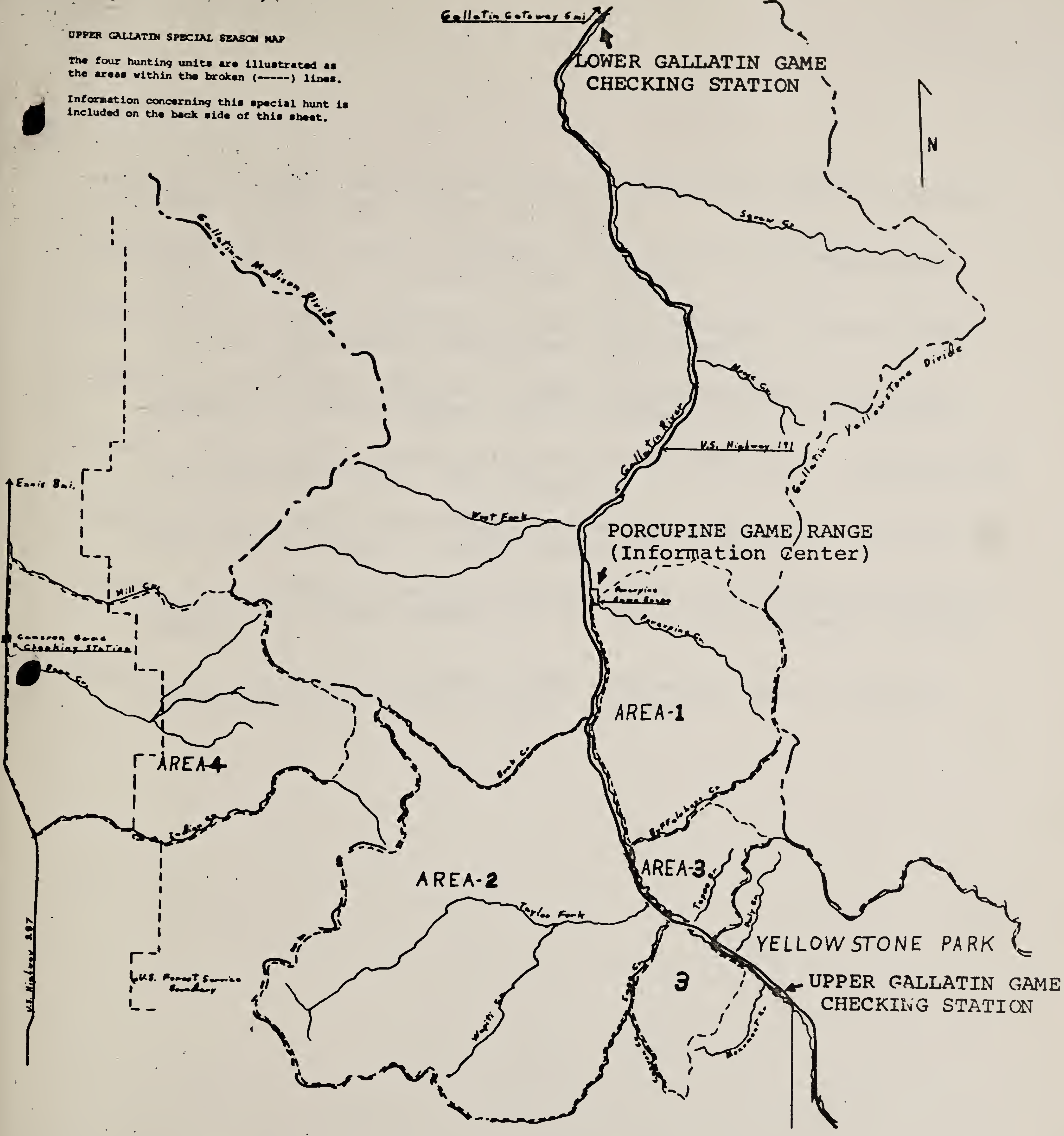
MONTANA FISH AND GAME COMMISSION

BY: Frank H. Dunkle, Secretary
December 14, 1971

UPPER GALLATIN SPECIAL SEASON MAP

The four hunting units are illustrated as the areas within the broken (-----) lines.

Information concerning this special hunt is included on the back side of this sheet.



Special elk permits must be validated at the lower Gallatin Game Checking Station on U. S. Highway 191 approximately six (6) miles south of Gallatin Gateway. Permits must be validated before hunters go into the hunting area.

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